APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/900,071	07/06/2001	Karl J. Bois	10004730-1	5845

			EXAMINER
22879	7590	02/10/2005	SHARON, AYAL I

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ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/900,071	BOIS ET AL.
	Examiner	Art Unit	
	Ayal I Sharon	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/6/01*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/21/01*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Introduction

1. Claims 1-21 of U.S. Application 09/900,071 filed on 7/6/2001 are presented for

examination.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. The prior art used for these rejections is as follows:

4. Barford et al., U.S. Patent 5,946,482. (Henceforth referred to as "**Barford**").

5. The claim rejections are hereby summarized for Applicant's convenience. The

detailed rejections follow.

6. **Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by**

Barford.

7. In regards to Claim 1, Barford teaches the following limitations:

1. A method of simulating an electronic circuit, the electronic circuit having a plurality of ports, said method comprising:

identifying signal transmission characteristics associated with each of said ports;
(Barford, especially: col.1, line 54 to col.2, line 2)

Examiner interprets Barford's "measurement points of the circuit" as corresponding to applicants' "measurement ports".

> selecting a plurality of test frequencies with which to measure frequency response of the electronic circuit at each of the ports;

(Barford, especially: col.2, lines 3-36)

Examiner interprets Barford's "test frequencies" as corresponding to applicants' "test frequencies".

> identifying, for each of said test frequencies, a signal characteristic at each of said ports in response to an application of each of said test frequencies at each of said ports;

(Barford, especially: col.2, lines 3-36)

Barford teaches: "By properly selecting test frequencies, one obtains information to predict an entire range of operations of a device (commonly extending from near zero hertz to several gigahertz)."

> extracting scattering parameters corresponding to each of the ports, for each test frequency, based on said signal characteristics; and

(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

> transforming said scattering parameters into a time domain representation of said electronic circuit.

(Barford, especially: col.2, lines 3-36)

Barford teaches: "The computer-based simulator may then operate by using an Inverse Fast Fourier Transform ("IFFT") to convert the parameters to the time domain ..."

8. In regards to Claim 2, Barford teaches the following limitations:

> 2. The method according to claim 1 wherein said extracting step includes forming, for each of said test frequencies, a scattering parameter matrix based on said signal characteristics.

(Barford, especially: col.2, lines 3-36)

Barford teaches: "Scattering parameters (or "S-parameters") are sometimes preferred, because the S-parameters of passive devices will always have an absolute value less than 1, dramatically increasing the stability of typical analysis based upon them."

9. In regards to Claim 3, Barford teaches the following limitations:

3. The method according to claim 1 wherein said signal characteristics comprise signal voltages at respective ones of said ports.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based analysis of response to the input signal conditions at the different measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a complete set of information from which to model circuit performance for any given input frequency or condition."

10. In regards to Claim 4, Barford teaches the following limitations:

4. The method according to claim 1 wherein said identifying step includes simulating an application of test signals corresponding to each of said test frequencies at each of said ports, wherein said test signals are applied to each of said ports one at a time through a predetermined characteristic impedance and remaining ones of said ports are terminated in said characteristic impedance.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

11. In regards to Claim 5, Barford teaches the following limitations:

5. The method according to claim 4 wherein said step of extracting includes determining a signal voltage at each of said ports in response to said simulating step and subtracting a predetermined value from a signal voltages at a port at which said test signals are applied to provide a scattering parameter representing reflective signal parameter values of said test signals.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

Examiner interprets the (Q-Y) element of the Barford's equation (see col.2, line 20) as corresponding to the claimed "subtracting step".

12. In regards to Claim 6, Barford teaches the following limitations:

6. The method according to claim 1 wherein said step of identifying signal transmission characteristics associated with each of said ports includes a step of using an n-dimensional field solver to extract parameter values.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based analysis of response to the input signal conditions at the different measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a complete set of information from which to model circuit performance for any given input frequency or condition."

Barford also teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

Barford therefore teaches the use of matrix computation to generate the computation results based on the sampled data responses of different measurement points and different inputs. Examiner finds that such matrix calculations will inherently be "n-dimensional", because there are more than one input frequency, and more than one measurement points."

13. In regards to Claim 7, Barford teaches the following limitations:

7. The method according to claim 6 wherein said n-dimensional field solver comprises a two-dimensional field solver providing distributed component parameter values corresponding to said ports, said component parameter values including one or more of circuit capacitance, inductance, resistance and conductance.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based analysis of response to the input signal conditions at the different measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a complete set of information from which to model circuit performance for any given input frequency or condition."

Barford also teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

Barford therefore teaches the use of matrix computation to generate the computation results based on the sampled data responses of different measurement points and different inputs. Examiner finds that such matrix calculations will inherently be "n-dimensional", because there are more than one input frequency, and more than one measurement points."

14. In regards to Claim 8, Barford teaches the following limitations:

8. The method according to claim 1 further comprising a step of simulating said electronic circuit using said time domain representation of said electronic circuit.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "The computer-based simulator may then operate by using an Inverse Fast Fourier Transform ("IFFT") to convert the parameters to the time domain ..."

15. In regards to Claim 9, Barford teaches the following limitations:

9. A method of simulating an electronic circuit, said method utilizing a digital processor and comprising:

identifying a plurality of signal transmission paths;
(Barford, especially: col.1, line 54 to col.2, line 2)

Examiner interprets Barford's "measurement points of the circuit" as corresponding to applicants' "measurement ports".

determining distributed electrical parameters associated with each of said transmission path; associating port designations with terminal ends of each of said ports;
(Barford, especially: col.2, lines 3-36)

Examiner interprets Barford's "test frequencies" as corresponding to applicants' "test frequencies".

determining a signal voltage at each of said ports resulting from a sequential application of a test signal to each of said ports, one at a time, said test signal applied through a characteristic impedance while others of said ports are terminated in said characteristic impedance;
(Barford, especially: col.2, lines 3-36)

Barford teaches: "By properly selecting test frequencies, one obtains information to predict an entire range of operations of a device (commonly extending from near zero hertz to several gigahertz)."

extracting scattering parameters corresponding to each of the ports based on said signal voltages determined at each of said ports; and
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

transforming said scattering parameters into a time domain representation of said electronic circuit.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "The computer-based simulator may then operate by using an Inverse Fast Fourier Transform ("IFFT") to convert the parameters to the time domain ..."

16. In regards to Claim 10, Barford teaches the following limitations:

10.   The method of claim 9 wherein said test signal includes a plurality of non-overlapping discrete signal frequencies sequentially applied to said ports.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "Unfortunately, use of the IFFT requires that the frequency response parameters represent evenly spaced frequencies, e.g., 0, 5, 10, 15 kilohertz, etcetera."

17. In regards to Claim 11, Barford teaches the following limitations:

11.   The method according to claim 10 wherein said extracting step includes forming, for each of said discrete signal frequencies, a scattering parameter matrix based on respective sets of said signal voltages.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

18. In regards to Claim 12, Barford teaches the following limitations:

12.   The method according to claim 9 wherein said step of determining a signal voltage at each of said ports includes simulating; said plurality of signal paths.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based analysis of response to the input signal conditions at the different measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a complete set of information from which to model circuit performance for any given input frequency or condition."

19. In regards to Claim 13, Barford teaches the following limitations:

13. The method according to claim 9 wherein said electronic circuit comprises an integrated circuit and said signal paths comprise metalization layers formed on said integrated circuit.
(Barford, especially: col.1, line 1 to col.3, line 36)

Examiner finds that "said signal paths comprise metalization layers formed on said integrated circuit" are inherent to integrated circuits.

20. In regards to Claim 14, Barford teaches the following limitations:

14.   The method according to claim 9 wherein said electronic circuit comprises a printed circuit board and said signal paths comprise transmission lines formed on said printed circuit board.
(Barford, especially: col.1, line 1 to col.3, line 36)

Barford teaches: "For example, when effects of adjacent high frequency transmission paths or surface mounts of an integrated circuit are considered together with the design of the integrated circuit, the resulting system model may be quite different than was the case for the integrated circuit alone."

21. In regards to Claim 15, Barford teaches the following limitations:

15.   The method according to claim 9 wherein said step of determining distributed electrical parameters associated with each of said transmission path includes a step of using a two-dimensional field solver to extract parameter values of said distributed electrical parameters.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based analysis of response to the input signal conditions at the different measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a complete set of information from which to model circuit performance for any given input frequency or condition."

Barford also teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

Barford therefore teaches the use of matrix computation to generate the computation results based on the sampled data responses of different measurement points and different inputs. Examiner finds that such matrix calculations will inherently be "n-dimensional", because there are more than one input frequency, and more than one measurement points."

22. In regards to Claim 16, Barford teaches the following limitations:

16.   The method according to claim 15 wherein said distributed electrical parameters include at least one of a circuit capacitance, inductance, resistance and conductance associated with each of said signal transmission paths.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

23. In regards to Claim 17, Barford teaches the following limitations:

17.   The method according to claim 9 further comprising a step of simulating said electronic circuit using said time domain representation of said electronic circuit.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "The computer-based simulator may then operate by using an Inverse Fast Fourier Transform ("IFFT") to convert the parameters to the time domain ..."

24. In regards to Claim 18, Barford teaches the following limitations:

18.   An apparatus comprising code for controlling a machine to simulate a circuit based on simulation parameters, and machine-readable media on which the code is stored, the simulation parameters representing frequency-dependent response at each of a plurality of measurement ports, said code directing a machine to:

        identify signal transmission characteristics associated with each of said measurement ports;
(Barford, especially: col.1, line 54 to col.2, line 2)

Examiner interprets Barford's "measurement points of the circuit" as corresponding to applicants' "measurement ports".

        identify a plurality of test frequencies with which to measure frequency response of the electronic circuit at each of the measurement ports;
(Barford, especially: col.2, lines 3-36)

Examiner interprets Barford's "test frequencies" as corresponding to applicants' "test frequencies".

predicting, for each of said test frequencies, a signal characteristic at each of said measurement ports in response to an application of each of said test frequencies at each of said measurement ports;
(Barford, especially: col.2, lines 3-36)

Barford teaches: "By properly selecting test frequencies, one obtains information to predict an entire range of operations of a device (commonly extending from near zero hertz to several gigahertz)."

extracting scattering parameters corresponding to each of said measurement ports, for each test frequency, based on said signal characteristics and
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

transforming said scattering parameters into a time domain representation of said electronic circuit to provide said simulation parameters.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "The computer-based simulator may then operate by using an Inverse Fast Fourier Transform ("IFFT") to convert the parameters to the time domain ..."

25. In regards to Claim 19, Barford teaches the following limitations:

19.   The apparatus according to claim 18 wherein the code directs the machine to form, for each of said test frequencies, a scattering parameter matrix based on said signal characteristics.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the frequency response parameters which, generally, are in the form of an impedance matrix or admittance matrix; it is also sometimes desired to use a "scattering" matrix, which is defined by the relation ..."

26. In regards to Claim 20, Barford teaches the following limitations:

20.   The apparatus according to claim 18 wherein the code directs the machine to simulate an application of test signals corresponding to each of said test frequencies at each of said measurement ports, wherein said test signals are applied to each of said

measurement ports one at a time through a predetermined characteristic impedance and
remaining ones of said ports are terminated in said characteristic impedance.
(Barford, especially: col.2, lines 3-36)

Barford teaches: "This information is then processed to determine the
frequency response parameters which, generally, are in the form of an
impedance matrix or admittance matrix; it is also sometimes desired to use
a "scattering" matrix, which is defined by the relation ..."

27. In regards to Claim 21, Barford teaches the following limitations:

21.   The apparatus according to claim 1.8 wherein the code directs the machine to
execute a two-dimensional field solver to extract parameter values corresponding to said
signal transmission characteristics associated with each of said measurement ports.
(Barford, especially: col.1, line 54 to col.3, line 36)

Barford teaches: "The simulators then usually conduct a time-based
analysis of response to the input signal conditions at the different
measurement points of the circuit."

Barford also teaches: "Ideally, a set of frequency responses provides a
complete set of information from which to model circuit performance for any
given input frequency or condition."

Barford also teaches: "This information is then processed to determine the
frequency response parameters which, generally, are in the form of an
impedance matrix or admittance matrix; it is also sometimes desired to use
a "scattering" matrix, which is defined by the relation ..."

Barford therefore teaches the use of matrix computation to generate the
computation results based on the sampled data responses of different
measurement points and different inputs. Examiner finds that such matrix
calculations will inherently be "n-dimensional", because there are more than
one input frequency, and more than one measurement points."

Correspondence Information

Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Ayal I. Sharon whose telephone number is

(571) 272-3714. The examiner can normally be reached on Monday through

Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Kevin Teska can be reached at (571) 272-3716.

Any response to this office action should be faxed to (703) 872-9306 or
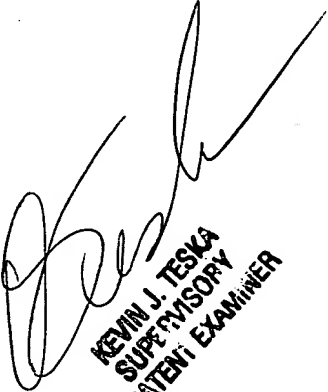
mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Any inquiry of a general nature or relating to the status of this application

or proceeding should be directed to the Tech Center 2100 Receptionist, whose

telephone number is (571) 272-2100.

Ayal I. Sharon

Art Unit 2123

February 4, 2005